

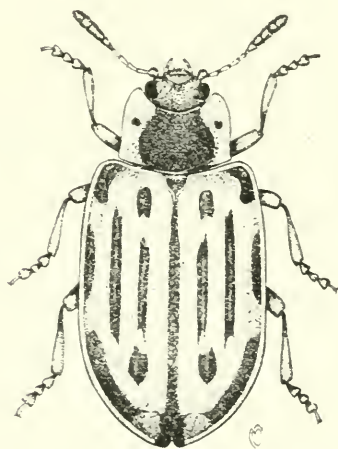
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MONTANA AGRICULTURAL COLLEGE
EXPERIMENT STATION

F. B. LINFIELD, Director

BULLETIN NO. 109

Thirteenth Annual
Report of the State Entomologist
of Montana



The Cottonwood Leaf Beetle, *Lina scripta* Fab.

BY
R. A. COOLEY

BOZEMAN, MONTANA
FEBRUARY, 1916

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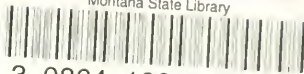
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THE MONTANA EXPERIMENT STATION,

Bozeman Montana



Thirteenth Annual Report of the State Entomologist of Montana

INSECT PESTS OF 1915

The amount of damage caused by insects in Montana during the season of 1915 was greater than in any other year since the office of state entomologist was created. The outstanding feature of the year was the abundance of grain pests, the worst of which was the army cutworm. This insect alone destroyed at least 100,000 acres of grain.

The more important insects which came to our notice during the year are briefly discussed and recorded.

ACARINA

Leaf Blister Mite (*Eriophyes pyri* Pgst.). For several years the leaf blister mite has been increasingly injurious in the apple orchards of the Bitter Root Valley and during the past season it is reported to have done more damage than any other orchard pest.

Clover Mite (*Bryobia pratensis* Garman). Several letters were received complaining that this mite was invading houses. In one instance it was reported as injuring clover lawns.

Red Spider (*Tetranychus bimaculatus* Harvey). In the vicinity of Flathead Lake red spiders were unusually injurious to raspberries.

Spotted Fever Tick (*Dermacentor venustus* Banks). One of the striking features of the season of 1915 was the appearance of this tick in large numbers in eastern Montana where it previously had attracted but little attention. A number of cases of spotted fever were also reported for the first time from this locality.

ORTHOPTERA

Grasshoppers (*Acerididae*). Not a single report of grasshopper injury was received during the season, which is rather remarkable considering the abundance of insects in general.

Coulee Cricket (*Peranabrus scabracollis* Thom.). This large, clumsy cricket, which attracted much attention in Washington during the past summer, also appeared in western Montana on the Flathead Reservation. In several places it caused considerable injury.

HEMIPTERA

Capsid injury to wheat (*Capsus ater* Linn). An unusual injury

to winter wheat was reported from Plains in April. An examination disclosed numerous black capsids sucking the juice from the plants, which became spotted at the point of attack. But little loss resulted from the attack.

Green Apple Aphis (*Aphis pomi* De G.). Present in about normal numbers.

Cabbage Aphis (*Aphis brassicae* L.). Not as injurious as in 1914.

Grain Root Aphis (*Forula occidentalis*). This plant louse occurs very commonly upon the roots of wheat and is often blamed for the injury caused by *Brachycolus tritici*. In no instance has *Forula* been observed to seriously injure its host plant.

Western Grain Aphis (*Brachycolus tritici* Gillette). This aphid which has been increasing and spreading in Montana for several years was highly injurious to winter wheat, in some instances completely destroying entire fields. Considerable time was spent in studying this important pest and its life history and a method of control have been worked out. Absolutely clean summer fallow is a sure preventive of injury.

Aphids in heads of grain. During August daily reports were received of aphids infesting heads of grain. Generally the specimens sent in were badly mashed and accurate determination was not always possible. Genera recognized were *Macrosiphum*, *Toxoptera* and *Aphis*. Little damage was done as the grain was well advanced when the insects first appeared in numbers.

Sugar Beet Root Louse (*Pemphigus betae* Doane). Investigations concerning this important sugar beet pest were carried on under the Adams fund as in previous years. It is hoped that a system of irrigation may be worked out which will reduce injury from this insect to a minimum.

Woolly Aphis (*Schizoneura lanigera* Hanseman). In the Bitter Root Valley this insect appears to be spreading and becoming more firmly established each year.

LEPIDOPTERA

Army Cutworm (*Chorizagrotis auxiliaris* Grote). Many sections of the State were devastated by armies of cutworms belonging for the most part to the above named species. This was by far the

most destructive insect of the year and is more fully discussed elsewhere in this report.

Mourning Cloak Butterfly (*Euranyassa antiopa* L.). The spiny caterpillars of this species were abundant in many parts of the State and were frequently sent in with the report that they were feeding on elm and willow foliage.

Noctuid working in cottonwood bark (*Parosagrotis vilepiana*). The larva of this species produces an unusual type of injury as it feeds upon the green bark of the cottonwood tree. It was sent in from Silver Bow County.

Army Worm (*Leucania unipuncta* Haworth). The notorious army worm which caused such widespread damage in 1911 in the East, was found in Montana for the first time this season. It was highly injurious to oats in the one locality in which it appeared.

Polyphemus Moth (*Telega polyphemus* Cramer). This showy moth is apparently working westward. It was taken for the first time in Montana at Huntley in 1914 and in 1915 it was sent in from Columbus and Bozeman.

Red Humped Caterpillar (*Schizura concinna* S. & A.). Specimens of this species were sent in from western Montana where they were said to be injuring fruit trees.

DIPTERA

Lip Bot Fly (*Gastrophilus haemorrhoidalis* Linn.). This species which was reported as far west as Billings in 1914 was taken during the past season in Yellowstone Park and in Sixteen Mile Canyon. At both places it was said that it had never been troublesome in previous years.

Mosquitoes (*Culicidae*). Because of recent popular demand for information concerning mosquitoes, this important group of insects was given special attention in 1915. Studies of the life history and methods of control were carried on at several points and collections of larvae and adults were made wherever possible. From the results of our studies, it appears that the following species are the most important from an economic standpoint: *Aedes sylvestris*, *A. spencetti*, *A. nigromaculus*, *A. curriei*, *A. pullatus* and *Culex tarsalis*.

Wheat Stem Maggots. Considerable injury to winter wheat was caused by dipterous maggots mining in the leaves and in the sheath. A study of this class of pests showed that at least three species were

involved,—*Meromyza americana* Fetch, *Meromyza nigriventris* Macq., and *Cerolontha femoralis* Meig.

COLEOPTERA

Beet Carrion Beetle (*Silpha biluberosa* Lee). During April and May this pest appeared in destructive numbers at many places in the sugar beet district around Billings. In some instances young beets were so badly injured that a very poor stand resulted and in one instance wheat was attacked.

Lesser Clover Weevil (*Phytonomus nigrirostris* Fab.). The first appearance of this insect in Montana was noted in the Jocko Valley during the past season. This insect closely resembles the alfalfa weevil in appearance and the manner of its attack but is not nearly as destructive.

Eyed Elater (*Haus oculatus* Linn). A specimen of this strange-appearing insect was sent us from Custer. It is the first one to be received into our collection.

Bumble Flower Beetle (*Euphoria iula* L.). In the Yellowstone Valley this beetle was again reported as injuring corn by working in the kernels at the tip of the ear.

False Wireworm (*Elodes extricata* var. *convexicollis* Blaisdell). False wireworms were very abundant in many localities and in several instances were injurious to newly sprouted grain.

Cottonwood Leaf Beetle (*Lina scripta* Fab.). During July and August this was the insect concerning which there was the greatest demand for information. Cottonwood and willow trees were attacked in all parts of the State. While this pest seldom kills trees outright, it causes the foliage to turn brown and greatly weakens the vitality of the tree. A drawing of the adult beetle appears on the cover of this publication.

Dung Beetle (*Aphodius inquinatus* Abst.). For the past two seasons this insect has appeared in enormous numbers and has attracted much attention. In the fall on warm, still days the air frequently appears filled with the adults, and horse droppings are completely worked over in a few minutes.

Wireworms (*Elateridae*). Numerous reports of wireworm injury were received during the course of the year, including injury to potatoes, corn and grain.

Some of the Principal State Interests in Entomology in 1915

THE ARMY CUTWORM

The outstanding feature of the year in Montana from the standpoint of the entomologist was an unprecedented outbreak of the army cutworm (*Chorizagrotis auxiliaris*). On April 2 we received a report of the presence of this insect in eastern Montana and after this many other reports came in from other parts of the State in rapid succession. The outbreak was quite general and severe. While some cutworms were reported from western Montana practically all of the damage was done east of the divide.

This insect is a very general feeder and refuses almost no plants that come in its way, yet practically all of the damage was done to fall wheat so far as our reports indicate. An attempt has been made to form an estimate of the acreage of wheat eaten off and we believe that fully 100,000 acres was destroyed. A large part of this was seeded again late in April or in May and in many cases good crops of spring wheat were harvested. Where reseeded was done the loss was only the cost of again preparing the soil and reseeded, together with any difference in the value of the harvested crop. In many cases, however, fields were only partly destroyed and the farmer was often in doubt whether or not he should reseed. The loss on the acreage that was not reseeded was considerable. A considerable amount of damage was done also to miscellaneous crops such as flax, alfalfa, and some tilled crops and plants in gardens.

Early in the outbreak an assistant was sent to an infested field for the purpose of performing tests with the use of poisoned bran mash with and without citrous fruit juices added. These tests showed that the bran mash without the fruit juices added was very effective and accordingly we proceeded to base our recommendations for the season on this mixture. As the season advanced we gained further experience with the use of this poison bran mash, all of which was distinctly in its favor; in fact we had no complaints of failure to get good results with its use and many very favorable comments were received.

To meet the emergency and supply the information needed a brief circular of information was hurried through the press. A circular letter was mailed to the newspapers of the State as follows:

Bozeman, Montana, April 16, 1915.

To the Newspapers of Montana:

This office desires to cooperate with the press of Montana in preventing, so far as possible, the damage to fall grain and other crops by the army cutworm.

We believe that many crops are being damaged without the owners knowing it. An emergency circular giving the most up-to-date information has just been printed and will be sent to all who request it. This gives directions for examining the field and gives remedies which we have used with much success this season. We will be glad to send these in bundles to those who will distribute them to farmers who need them.

In some localities there is need for community cooperation. Bankers and business men should aid the farmers to organize. In places where bad outbreaks are occurring the poisoned bran mash should be mixed up in quantity and distributed to the farmers at cost.

Very respectfully,

(Signed) R. A. Cooley,

Entomologist.

Besides this special letters were written to some newspapers. Other letters were written to bankers and elevator operators. The result was that we received many requests for the circular. Bundles of from ten to fifty were sent to different parties all over the State. The circular was held in type and reprinted twice.

The correspondence on the subject of recognizing and controlling the army cutworms became heavy. As many as forty-eight letters were written in a single day.

Two assistants from this office spent much of their time in the field cooperating with the farmers during this outbreak. There can be no doubt that in several instances a sum greater than the entire appropriation made to the office of the State Entomologist was saved on a single farm, and it is clear that throughout the State the amount of the whole appropriation (\$2,000) was saved many times over.

Advantage was taken of the presence of this insect in such unusual numbers to secure further information regarding its life-

history. Accordingly certain experiments and studies were undertaken under the Federal Adams fund, which have resulted in gathering facts of the greatest importance. These will be prepared for publication during the winter.

THE ALFALFA WEEVIL

General interest has continued in the effort to prevent the introduction of the alfalfa weevil into Montana from Utah, Idaho, and Wyoming where it now exists. Several reports of the weevil in Montana have been looked up, but in no instance have we found this insect, excepting in shipments coming from Utah. The work of the lesser clover weevil (*Phytonomus nigrirostris*) closely resembles that of the alfalfa weevil and the larvae of the two insects are very much alike. A destructive colony of the lesser clover weevil appeared in the western part of the State this year and there is small wonder that farmers were alarmed.

Every effort is being made to keep the alfalfa weevil out of Montana. If it should be introduced and if it should be as injurious here as it is in Utah, where it is continuing to be very destructive year after year, it would be a very serious thing for Montana where the alfalfa crop takes such a prominent place in the agriculture of the State.

Until further information is received, at least, it will be the policy of this office to recommend maintaining a reasonable quarantine in order that the chances of introducing this insect may be reduced to a minimum.

THE WESTERN WHEAT APHIS

The outbreak of army cutworms and the newspaper comments upon it in various parts of the State directed unusual attention to other pests of wheat. Farmers in looking for cutworms found other insects and wrote us about them. Some of these are of considerable importance. A number of reports of damage by the western wheat aphid, *Brachycolus tritici*, were received. This insect was first brought to our attention several years ago and as practically nothing was known regarding its life-history and the means of controlling it we have given special attention to it. Wheat plants affected by the wheat aphid have a characteristic appearance which is easily recognized when once seen. Young infested plants show a thick-

ening and broadening of the leaf blades. A very few aphids on a plant may have a surprisingly injurious effect. Some plants show in the later stages of injury a characteristic twisting of the stem and a deformed head. The injury often appears only in spots in the field, but sometimes entire fields are affected and much damage results.

The only literature on the life-history and control has been issued by this office. We have been able to recommend an effective method of control and we feel that when grain growers become familiar with the insect and the way to control it the damage will be much reduced.

One important scientific paper on this subject has been published during the year* and it is intended to print and distribute a bulletin during the coming year.

A NEW CUTWORM

A little known cutworm (*Euxoa* near *quadridentata*) was brought to our attention by Senator T. O. Larson of Choteau who reported damage to wheat near Brady in Teton County. A considerable number of acres of grain had been severely damaged and some alarm was felt in the neighborhood. This insect was studied in the insectary where valuable information was received and it will be given further attention as we have opportunity. It is not probable that it will be found to be nearly so important a pest as the army cutworm.

THE WHEAT STEM MAGGOT

Farmers in western Montana reported a peculiar injury to grain in May. Injured plants when examined were found to contain small, white maggots in the axis. These turned out to be the young of the wheat stem maggot, *Cerodontha femoralis*. These maggots bore down through the stem, completely destroying the plant, and go out through the crown into the earth where they pupate. The eggs are laid on the leaves by the parent flies which are very small and not easily found.

The living insects were studied in the insectary and the stages of development were worked out. It is hoped that further study may devise a method of controlling this little known pest.

Parker, J. R. The western wheat aphid. In *Journal of Economic Entomology*, Vol. 9, No. 1, 1916.

Along with this insect we found also sheath maggots (*Meromyza americana* and *M. nigriventris*) which were doing some damage, but less than the stem maggots. A study of these maggots will be continued.

THE SPOTTED FEVER TICK

In the Twelfth Annual Report of the State Entomologist a brief review of the status and organization of the work on the spotted fever tick is given. In the past particular attention has been given to the tick in western Montana where in certain localities the spotted fever exists in its most virulent form. This work, now under the supervision of the Montana State Board of Entomology, is being pushed with energy and much success. Good progress is being made in the eradication of the tick and the reduction of the number of fever cases and deaths.

During the season of 1915 the tick took on a new and larger significance in Montana by the appearance in the eastern part of the State of a considerable number of cases of the spotted fever in localities where so far as we know none had occurred before. This has led to a greatly increased interest in the tick in several counties and it is now necessary that a thorough study of the situation be made.

MOSQUITOES

One of the most striking developments in official entomology in Montana in recent years has been the increasing and insistent demand for information regarding the best procedure to be adopted to secure relief from mosquitoes. We have had demands from towns and many individuals for assistance. Very little has been done in the study of mosquitoes under conditions such as we have in Montana where irrigation is so extensively practiced and where the mosquito fauna is so different from that in eastern states. It is assumed by many who write in for information that all it is necessary to do is to state what is being done in other localities. As a matter of fact, while some good can be done by drainage of stagnant water and oiling where mosquito larvae are found, it is necessary to know much more than we now do regarding the kinds of mosquitoes present and the habits of the more important ones in order that we may intelligently meet the situation.

A study of mosquitoes has been taken up and will be pushed as rapidly as possible with the limited funds at our disposal. A great good can be done for Montana with a relatively small amount of money spent in this direction and much annoyance to man and domestic animals may be prevented. It is hoped that within a year or two a preliminary report may be printed.

FOUL BROOD OF THE HONEY BEE

The situation with respect to the foul brood of bees remains unchanged excepting that it is being found in new localities. An attempt to secure the passage of a foul brood law by the Fourteenth Legislative Assembly failed.

A large number of colonies have been destroyed and in the part of the State most seriously affected the industry has been greatly injured. It is not easy to predict what will be the final result of the ravages of this disease if no legislation is passed. If we may assume that the results will be much the same as in other localities we may say that before many years the disease will be all over the State and the number of colonies will be greatly reduced.

Montana State Entomologist Law

Be it enacted by the Legislative Assembly of the State of Montana:

Section 1. The entomologist of the Montana Agricultural College and Experiment Station shall be known as the State Entomologist of Montana.

Section 2. It shall be the duty of the State Entomologist to conduct field investigations of the injurious insects of fruits, vegetables, grains, grasses, forage crops, including clover and alfalfa, root crops, shade trees, ornamental plants, and any other insects that may become injurious. When it becomes known to the State Entomologist that an outbreak of an insect has occurred in any part of the State, it shall be his duty, so far as is possible without conflicting with his other duties, to go to the scene of the outbreak, determine its extent and seriousness, and, when necessary, publish or make public demonstration of the best remedies to be employed.

Section 3. The Entomologist shall make an annual report to the Governor of the State, on or before the first day of January, which report shall be published by the Experiment Station as one of its regular bulletins, and shall contain a report of his work and expenditures under this Act.

Section 4. The State Entomologist shall receive no compensation for his services other than what he may receive from the Montana Agricultural College and Experiment Station, but his actual traveling expenses not to exceed three hundred dollars* shall be paid, and such sum is hereby annually appropriated for the purposes of this act out of the moneys of the State Treasury, not otherwise appropriated.

Upon the certification of the Secretary of the Executive Board of the Montana Agricultural College and Director of the Agricultural Experiment Station, the State Auditor is authorized to issue warrants to cover the traveling expenses of the State Entomologist while engaged in carrying out the provisions of this Act.

Section 5. This Act shall take effect and be in force from and after its passage and approval by the Governor.

Approved March 4, 1903.

* This sum has been increased from time to time by the various sessions of the legislature and the appropriation made by the last legislature was \$2,700.00.

